THE FLYING MAN

THE fatal experiment made by M. de Groof at Cremorne Gardens could not possibly have led to success. The possibility of directing an apparatus in the air by any mechanical contrivance, without actually using the lifting power of gas, is out of the question, and we do not wish to enter into a discussion on that point. But several interesting problems may be examined *à propos* of the inquest held by the coroner on the death of the unfortunate man.

De Groof's wings, irrespective of their motive power, may be regarded as two imperfect parachutes intended to diminish his rate of falling, and, if kept horizontal, prevent it increasing above a certain rate. It remains to see if their surface was large enough to keep that velocity within reasonable limits. The wings of De Groof were 30 ft. by 4 ft.; but being irregularly shaped, we may suppose the surface of each was 100 sq. ft., or in round numbers 200 sq. ft. for the two. The weight of the machine not being far from 4 cwt. if we include the man, we may say in gross numbers that each square foot had a kilogramme to support, which is more than ordinary; the parachute maker taking 1 kilogramme for each square metre, which is about ten times smaller.

But to ascertain if the velocity, although being larger than under ordinary circumstances, was really dangerous we must go to the formulæ established by General Didion and quoted by Poucelet—

$$R = 1{\cdot}936\,(A\,0{\cdot}036 + 0{\cdot}084\,v^2)$$

Under the above circumstances, R the rate of falling is always inferior to the value of x given by the equation

$$10 = 1{\cdot}936\,(0{\cdot}036 + 0{\cdot}084\,x^2)$$

x being obviously enough the velocity for which $R =$ to the weight pressing on the unit of surface. When the motion is such the velocity cannot be increased. If we make the calculation it is easy to see that the velocity is about 7 metres per second, almost = the fall from 3 metres to the ground. It is large, but not too large for a practised jumper, if he were clever enough to keep his balance, which is not very easy, it must be confessed.

Experiments on parachutes show that great oscillations always take place if the experimenters have not placed a small hole in the centre of their parachute, which increases stability at the expense of resistance. The motion of the wings, if they are working together, would very likely render the same service to the occupant of the machine, as they prevent the accumulation of the air. Unfortunately, to keep them working evenly is a difficult matter, requiring not only force of muscle but great presence and firmness of mind. The so-called *queue* or rudder was a useless encumbrance. A man working hard with his two hands, fighting for his life, cannot be expected to attend to direction with his legs attached to a rudder. The lifting power of the wings must have been very small indeed, although diminishing in some respects the rate of falling; but it is not easy to understand how a calculation may be made of the amount of mechanical power exerted in each stroke. The question must be left open for future examination.

W. DE FONVIELLE

NOTES

A CIRCULAR has been issued by the Hon. Local Secretaries of the Belfast meeting of the British Association, calling attention to the numerous objects of interest, natural and mechanical, with which the town and neighbourhood of Belfast, as well as the county of Antrim, abounds. The whole Province of Ulster is full of objects of the highest interest to the admirer of natural scenery, to the geologist, the naturalist, and the antiquarian; and many of its most interesting localities, such as the Antrim Coast, the Giant's Causeway, the Mourne Mountains, Lough Neagh, the Round Towers of Antrim and Drumbo, are within an easy distance of Belfast. The local secretaries state that a large number of the hotels will be open to members of the Association at the usual charges, and that a list of persons willing to let rooms has been prepared. We sincerely hope that this time there will be no complaint to make on the score of accommodation. Conveyance to Belfast can be obtained from any part of the country at very reasonable rates.

THE Right Hon. Lord O'Hagan will preside over the Section for Economic Science at the meeting of the British Association.

A MEETING of the General Council of the Yorkshire College of Science was held at Leeds on the 17th inst. The Council proceeded to the election of the Professor of Geology and Mining, and the Professor of Physics and Mathematics. The vote of the Council was unanimously given to Mr. A. H. Green, M.A., late Senior Fellow of Gonville and Caius College, Cambridge, as Professor of Geology; and Mr. A. W. Rücker, M.A., Fellow of Brasenose College, Oxford, as Professor of Physics and Mathematics. Prof. Green for the last five years has held the appointment of Lecturer on Geology at the School of Military Engineering at Chatham. Prof. Rücker in Oct. 1871 was appointed Demonstrator in the Physical Laboratory of Oxford University under Prof. Clifton. The appointment of the Professor of Chemistry will be made on Friday. The Council recorded a cordial vote of thanks to Sir A. Fairbairn for his liberal offer of 2,000*l.*, provided that the sum of 60,000*l.* was placed in the hands of the treasurer, and resolved to take the necessary steps for raising the required amount.

AT King's College, London, the Chair of Zoology and Comparative Anatomy, vacated by the resignation of Prof. T. Rymer Jones, F.R.S., has been filled by the election of Mr. A. H. Garrod, Fellow of St. John's College, Cambridge, and Prosector to the Zoological Society. The Chair of Materia Medica and Therapeutics, vacated by the resignation of Prof. A. B. Garrod, M.D., F.R.S., has been filled by the election of Dr. E. B. Baxter, Medical Tutor to the College.

THE prospectus has just been issued of a company to establish an aquarium for London, close to Westminster Abbey.

A BALLOON experiment to test a steering apparatus is soon to be made under the auspices of the authorities at Woolwich.

NORTHUMBERLAND, in Pennsylvania, on the Susquehannah, the place where Dr. Priestley was buried, has been selected by Americans as the spot at which all chemists are invited to gather on August 1 next, the hundredth anniversary of the discovery of oxygen by the illustrious philosopher. An address is to be delivered over his grave. This proposition of Dr. Bolton has met with a cordial response from a large number of chemists. Prof. Henry, of the Smithsonian Institution, proposes to be present with some of the original apparatus of Priestley from the Smithsonian collections. August 1 falling on Saturday, the meeting will be called for the day previous. A programme will be soon issued by the committee in charge.

THE Governing Body of Christ Church, Oxford, have voted the sum of 100*l.* per annum for five years in aid of the Biological Department of the Museum.

THE New Falcons' Aviary in the northern part of the Zoological Society's Gardens beyond the canal has just been completed, and is now tenanted by a fine series of the Diurnal Birds of Prey, principally exotic. Amongst them are examples of several rare species, such as the Red-backed Buzzard (*Buteo erythronotus*), the Laughing Eagle (*Herpetothires cachinnarus*), and the Malayan Crested Eagle (*Spizaëtus caligatus*). Amongst the less-known European species are a pair of Bonelli's Eagles, a pair of Red-footed Falcons, and an Eleonora Falcon.

M. Dourneau Dupré, a French explorer of the Sahara, has been killed by marauders on the way from Ghadames to Rhat. French colonists are making great progress in opening through the desert a road to Senegal by Timbuctoo and Niger; but Algerian refugees are their most determined opponents. The prospect of introducing water from the Mediterranean into the Chott has created a sensation in the colony and is very likely to lead to new efforts in desert exploration.

M. de Lesseps' scheme for making an inland sea in Algeria seems to have excited great alarm in some of the French journals. It is feared that the resulting evaporation will have a bad effect on the climate of France, one journal going so far as to suggest a return of the glacial epoch!

We have just received the first two parts of a new monograph on the *Trochilidæ* or Humming Birds, by M. E. Mulsant, the well-known coleopterist, and the late M. E. Verreaux.

The second series of the superb work "On the Butterflies of North America," by Mr. William H. Edwards, has just been commenced with the appearance of Part I. and with the promise of even greater beauty and excellence than the one recently closed. The illustrations, as in the preceding series, were drawn by Miss Mary Peart, who has made a specialty of this branch of art, and coloured at the establishment of Mrs. Bowen, of Philadelphia. The work bears the imprint of Hurd and Houghton, New York.

We understand that Lieut. Cameron's journal, giving an account of his journey from Unyanyembe to Ujiji, has arrived in this country. He passed over a new route, to the south of that traversed by Capt. Burton, and north of Stanley's; and has thrown much light on the geography of the southern half of the Malagarazi drainage area. He has obtained several latitudes, and took a series of hypsometrical observations; but his most important work has been the final settling of the questions respecting the height of lake Tanganyika above the sea; and the latitude and longitude of Ujiji. Lieut. Cameron has recovered, at Ujiji, a most important map drawn by Dr. Livingstone, of the unknown country between Mikindany and Lake Nyassa, without which the record of the great explorer's discoveries would be very incomplete. Lieut. Cameron found the country between Unyanyembe and Ujiji in a more dangerous and unsettled state than ever. Mirambo and an independent body of runaway slaves were in complete possession of the route; and, though they would not molest an English officer, no Arab caravan or body of negroes could have passed. The insurgents attack and drive back all such parties, and the people would destroy all their food rather than give it to them. Lieut. Cameron's labours, first in his gallant attempts to succour Livingstone, then in furnishing aid to the explorer's servants, who brought down his body and effects, and finally in pressing onwards, in the face of great dangers and privations, to recover the journal and map at Ujiji, are deserving of the admiration of his countrymen. He is now on the verge of new discoveries, and resolved to achieve them; and we trust there will be a liberal response to the appeal for funds. Subscriptions to the Cameron Expedition Fund are received by Messrs. Ransom and Co., 1, Pall Mall East.

In a paper in Petermann's *Mittheilungen* (Heft vii. 1874) by Dr. Joseph Chavanne, of Vienna, on "The Arctic Continent and Polar Sea," the author deduces the following conclusions from the data furnished by recent expeditions, and which he carefully discusses:—1. The long axis of the arctic land-mass (which probably consists of an island archipelago separated by narrow arms of the sea, perhaps only fjords) crosses the mathematical pole; it thus bends round Greenland, north of Shannon Island, not towards the north-west, but runs across to 82° or 83° N. lat. in a northerly direction, proceeding thence towards N.N.E. or N.E. 2. The coast of this arctic continent is consequently to be found between 25° and 170° E. long. in a mean N. lat. of 84° and 85°, the west coast between 90° and 170° W. long. in a latitude from 86° to 80°. 3. Robeson Channel, which widens suddenly north of 82° 16′ N. lat., still widening, bends sharply in 84° N. lat. to the west; Smith Sound, therefore, is freely and continuously connected with Behring Strait. Grinnell Land is an island which probably extends to 95° W. long., south of which the Parry Islands fill up the sea west of Jones's Sound. 4. The sea between the coast of the arctic polar land and the north coast of America is traversed by an arm of the warm drift-current of the Kuro Siwo, which pierces Behring Strait, and thus at certain times and in certain places is free of ice, allowing the warm current to reach Smith Sound. 5. The Gulf Stream gliding between Bear Island and Novaya Zemlya to the north-east washes the north coast of the Asiatic continent, and is united east of the New Siberia Islands with the west arm of the drift current of the Kuro Siwo. On the other hand, the arm of the Gulf Stream, which proceeds from the west coast of Spitzbergen to the North, dips, north of the Seven Islands, under the polar current, comes again to the surface in a higher latitude, and washes the coast of the arctic polar land, the climate of which, therefore, is under the influence of a temporarily open polar sea; hence both the formation of perpetual ice, as well as excessive extreme of cold, is manifestly impossible. 6. The mean elevation of the polar land above the sea diminishes towards the pole. 7. The sea between Spitzbergen and Novaya Zemlya to Behring Strait is even in winter sometimes free of ice, and may be navigated in summer and autumn. 8. The most likely routes to the pole are:—first, the sea between Spitzbergen and Novaya Zemlya; and second, the sea north of Behring Strait along the coast of the unknown polar land.

A new geological survey of the State of Pennsylvania has been ordered, and the bill providing for it has passed the Legislature and has received the signature of the Governor. Money for three years has been voted. Prof. J. P. Lesley, of the University of Pennsylvania, has been appointed Geologist-in-Chief.

The programme of arrangements for the thirty-first annual meeting of the British Archæological Association is just out. The meeting will be held at Bristol in the week between Aug. 4 and 11, under the presidency of Mr. K. D. Hodgson, M.P. Excursions will be made to various places of interest in the surrounding district. Among the papers to be read at the evening meetings are the following:—On unpublished historical documents at Bristol, by W. de Gray Birch, Hon. Palæographer; and On the records of Merchant Adventurers, by Mr. J. de Haviland.

We learn from the Report of the Radcliffe Observer that the number of transits observed from July 1, 1873, to July 1, 1874, is 3,093; and the number of zenith-distances, 4,101. The number of stars observed in the same interval is 1,585. Coggia's comet has been observed four times on the meridian and four times with the heliometer. With the heliometer, in addition to a small selected list of double stars which have been observed as usual, a series of ten measures of the equatorial and polar diameters of Jupiter has been made, and the diameter of Uranus has been measured several times. These observations have been made chiefly by Mr. Bellamy. The volume containing the results of observations for 1871 is complete and ready for distribution. This volume contains a catalogue of 1,331 stars:—97 observations of the sun, 51 observations of the moon, 25 of Mercury, 18 of Venus, and 14 of Mars; a catalogue of 21 double stars, of which several have been observed repeatedly; 11 measures of the equatorial and polar diameters of Mars, with the deduced apparent ellipticity, and diameter at mean distance; 8 occultations of stars by the moon, with the equations deduced from the occultations; and, finally, a considerable list of shooting-stars observed chiefly by Mr. Lucas. Considerable advance has also been made in the reductions for 1872-73.

We would draw special attention to the Catalogue of the Anthropological Collection lent by Col. Lane Fox for exhibition in the Bethnal Green Museum. Only Parts I. and II. have been yet published, and these are almost entirely occupied with Weapons, which are divided into various classes, the lists under the various classes, or rather the contents of the various screens on which the specimens are arranged in the museum, forming the subjects of dissertations by Col. Lane Fox, who endeavours to trace out the probable origin and development of the various kinds of weapons. The principles which have guided Col. Lane Fox in making and arranging his valuable collection, he pointed out in his paper read at Bethnal Green on July 1, an abstract of which will be found in our last number, p. 217. He has abandoned the mere geographical arrangement, and adopted a principle as scientific, and we hope as productive, as that which obtains in natural history. A student of anthropology going carefully over Col. Lane Fox's collection at Bethnal Green, with this catalogue in his hands, would find himself both interested and instructed to a degree that it would be difficult to attain anywhere else.

We rejoice to see from the tone of the replies to questions in the House of Commons on Monday by Mr. Disraeli and Lord Henry Lennox, that Government is conscious of how poorly housed some of our scientific collections are, and seems really disposed to take steps to remedy the evil. Mr. Disraeli said, in reply to a question concerning the Patent Museum, that it is not the only public institution which is suffering from want of space and of suitable accommodation. "That is now a crying grievance with respect to all our public buildings, collections, and offices. In regard to the Patent Museum, however, I am aware from a communication which I have received from my noble friend the First Commissioner of Works, that the matter is at present engaging attention." Lord Henry Lennox confirmed this by subsequently stating that he intended to propose to Her Majesty's Government a scheme which, if it were agreed to, would enable him to offer the Patent Museum suitable accommodation in the southern block of the International Exhibition buildings.

Mr. John Murray has in the press a memoir of Sir Roderick I. Murchison, based upon his journals and letters, with notices of his scientific contemporaries, and a sketch of the rise and progress, for half a century, of Palæozoic geology in Britain, by Prof. Archibald Geikie, LL.D., F.R.S., &c. It will be illustrated with portraits, and will be published in two octavo volumes.

Mr. Karl Trübner, of Strasburg, has recently published one part of a geological map of the neighbourhood of Heidelberg, the work of Drs. Benecke and Cohen. We especially draw attention to the fact that contour lines are given faintly marked in red. The other part, and the letter-press description, will not be ready till next year.

M. Cailletet, in studying the compressibility of gases, has been led to investigate the resistance which glass tubes oppose to pressure. In one experiment a tube 21·7 in. long, and 0·7 in. diam., was crushed by an outside pressure of 77 atmospheres, while half that pressure sufficed to break it when exerted on the interior.

The Geologists' Association has organised a lengthened excursion to the Cotteswold Hills, May Hill, and the Severn Valley, extending from Monday last, July 20, to Saturday, July 25. The head-quarters is at Cheltenham. Judging from the programme this excursion promises to be one of great interest; the directors are Dr. Thomas Wright, F.G.S., Mr. J. Logan Lobley, F.G.S., Mr. W. C. Lacy, F.G.S., and the Rev. W. S. Symonds, F.G.S.

The first volume of the United States Commission of Fish (8vo, 899 pp., 38 plates and 3 maps) has been recently issued from Washington. In addition to reports of proceedings there are given arguments for and against protective laws, the natural history of some of the most important food-fishes; catalogue of marine algæ of southern New England; and papers on physical characters, invertebrate animals, &c., of different districts.

Following the report of the Inspectors of Salmon Fisheries in England and Wales, that from the Inspectors in Ireland has just been issued, containing statistics concerning not only the salmon fisheries, but the deep-sea and coast fisheries as well. It is difficult, from the form of the report, to give any general idea of the condition of the salmon fisheries, but they appear to be slightly increasing in productiveness. The same complaints are made in Ireland as in England of the dangers from pollutions, and from the want of passes over the weirs. But the inspectors do not appear to have done anything to remedy either of these evils. The oyster fisheries are in a decaying state, and the beds licensed to private persons are almost unproductive; naturally better situated than England for the production of oysters, it seems a great pity that Ireland should not yield a large number of these molluscs, if proper care were only taken, and a little energy and capital expended in improving the beds. The herring fishery for the year was less than in 1872, while the mackerel fishery was nearly double; pilchards, however, are almost unutilised, though the mass of wealth in the waters is sufficient to make an industry that would rival that of the Cornish fisheries. If the inspectors could put a little energy into the matter and the people be made to see their opportunities, the fisheries of Ireland might be the richest in the world.

There appears a prospect of good coal being shortly made available for consumption in Japan. The largest of the coalfields of Japan, that of Takosima, has come into possession of the Japanese Government, and it is hoped that an increased outlay of capital will produce satisfactory results.

The *New Quarterly Magazine* for July contains, among other articles, an essay On birds and beasts in captivity, by Archibald Forbes, and an interesting paper by Mr. Evershed, On habit in plants and power of acclimatisation, in which, *àpropos* of the present state of the question of sewage farming, he remarks:—"It is a serious drawback to the profits of sewage cultivation that only certain plants are disposed to consume so much liquid as is offered to them under that system of management. Cereals are not drinkers to any large extent, and will not suddenly change their habits. They have enough to do to swallow the ordinary amount of wet which prevails in our climate, being naturally partial to rather drier countries like South Russia, Poland, and Spain."

The additions to the Zoological Society's Gardens during the past week include three Giraffes (*Camelopardalis giraffa*) from Upper Nubia, purchased; two Passerine Owls (*Glaucidium passerinum*), European, presented by Mr. C. W. Tait; a Reeves' Muntjac (*Cervulus reevesi*), born in the Gardens; a Slow Loris (*Nycticebus tardigradus*), from the Malay region, deposited; a Coati (*Nasua nasica*), brown variety, and a Spotted Cavy (*Coelogenys paça*) from South America, purchased; two Bronze-winged Pigeons (*Phaps chalcoptera*) and an Olive Weaver Bird (*Hyphantornis capensis*), hatched in the Gardens.